

Fig. 1

A: write data
B: high order bit
C: low order bit
D: read data
3: control portion
4: bit switching portion
5: bit switching portion
6: write address counter
7: read address counter
8: address conversion portion
9: address conversion portion
10: address conversion portion
11: address conversion portion
12: address switching portion
13: address switching portion
14: address switching portion
15: address switching portion
16: read data switching portion

Fig. 4

A: write data
B: memory 1 write address
data
C: memory 2

SECRET

B: memory 1 read address

C: memory 2

A: 1st, 3rd, 5th, 7th rows: unchanged

Fig. 7

B: 2nt, 6th rows: shifted one place

D: 4th, 8th rows: shifted three places

A: 1st row: unchanged

C: 3rd row: shifted two places

E: 5th row: shifted four places

G: 7th row: shifted six places

H: 8th row: shifted seven places

Fig. 10

A: write data

B: memory 1 write address
data

C: memory 2 write address
data

D: read data

E: memory 1 read address
data

F: memory 2 read address
data

Fig. 11

A: write data

B: memory 1 write address
data

C: memory 2 write address
data

D: read data

E: memory 1 read address
data

F: memory 2 read address
Data

DATE RECEIVED

[illegible][illegible]

DATE RECEIVED

[illegible]

DATE RECEIVED

0967-8113

[illegible]

DATE RECEIVED

DATE RECEIVED

[illegible]

DATE RECEIVED

DATE RECEIVED

[illegible][illegible][illegible][illegible]

DATE RECEIVED

DATE RECEIVED

[illegible][illegible]

302: frequency-of-occurrence generating portion

303: memory

305: selector

A: compressed image data

B: Huffman code

C: decoded data

R1: register

C1: comparator

Ri: register

Ci: comparator

Fig. 17

302: frequency-of-occurrence generating portion

303: memory

321: constant storing portion

322: minimum code storing portion

323: code length detecting portion

324: selector

325: adder

A: Huffman code

B: frequency of occurrence

C: decoded data

D: code length

Fig. 18

100: DCT process portion
200: quantizing portion
206: Huffman encoding portion
400: quantization table
500: encoding table
800: reverse DCT process portion
700: dequantization portion
211: Huffman decoding portion
A: original image data
B: compressed image data
C: reproduced image data

Fig. 19

A: formation of blocks of image data
B: block

Fig. 20

A: 8 X 8 pixel block
B: DCT process
C: frequency

Fig. 21

110: one-dimensional DCT circuit
120: inversion memory
130: one-dimensional DCT circuit

Fig. 22

A: frequency in horizontal direction

B: frequency in vertical direction

C: low

D high

Fig. 23

A: zigzag scan

B: DCT coefficient

Fig. 24

A: raster scan (direction of rows)

B: raster scan (direction of columns)

Fig. 25

A: raster scan (direction of rows)

B: zigzag (direction of columns)

Fig. 26

221: bank memory

222: Huffman encoding circuit

Fig. 27

Eight cycles

Fig. 28

311: head search process portion

312: memory

(2^k words)

A: compressed image data

C: decoded data

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

FIG. 2(a)

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

FIG. 2(b)

0	1	2	3	4	5	6	7
9	8	11	10	13	12	15	14
16	17	18	19	20	21	22	23
25	24	27	26	29	28	31	30
32	33	34	35	36	37	38	39
41	40	43	42	45	44	47	46
48	49	50	51	52	53	54	55
57	56	59	58	61	60	63	62

FIG. 2(c)

0	0	2	4	6	0	1	3	5	7
4	9	11	13	15	4	8	10	12	14
8	16	18	20	22	8	17	19	21	23
12	25	27	29	31	12	24	26	28	30
16	32	34	36	38	16	33	35	37	39
20	41	43	45	47	20	40	42	44	46
24	48	50	52	54	24	49	51	53	55
28	57	59	61	63	28	56	58	60	62

FIG. 2(d)

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0	8	16	24	32	40	48	56
1	9	17	25	33	41	49	57
2	10	18	26	34	42	50	58
3	11	19	27	35	43	51	59
4	12	20	28	36	44	52	60
5	13	21	29	37	45	53	61
6	14	22	30	38	46	54	62
7	15	23	31	39	47	55	63

FIG. 3(a)

0	8	16	24	32	40	48	56
1	9	17	25	33	41	49	57
2	10	18	26	34	42	50	58
3	11	19	27	35	43	51	59
4	12	20	28	36	44	52	60
5	13	21	29	37	45	53	61
6	14	22	30	38	46	54	62
7	15	23	31	39	47	55	63

FIG. 3(b)

0	8	16	24	32	40	48	56
9	1	25	17	41	33	57	49
2	10	18	26	34	42	50	58
11	3	27	19	43	35	59	51
4	12	20	28	36	44	52	60
13	5	29	21	45	37	61	53
6	14	22	30	38	46	54	62
15	7	31	23	47	39	63	55

FIG. 3(c)

0 4 8 12 16 20 24 28	1				0 4 8 12 16 20 24 28	2			
	0	16	32	48		8	24	40	56
	9	25	41	57		1	17	33	49
	2	18	34	50		10	26	42	58
	11	27	43	59		3	19	35	51
	4	20	36	52		12	28	44	60
	13	29	45	61		5	21	37	53
	6	22	38	54		14	30	46	62
	15	31	47	63		7	23	39	55

FIG. 3(d)

WRITE DATA																																			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
WRITE ADDRESS																																			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
DATA																																			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
WRITE ADDRESS																																			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
DATA																																			
1	3	5	7	8	10	12	14	17	19	21	23	24	26	28	30																				

WRITE DATA																																			
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63				
WRITE ADDRESS																																			
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																				
DATA																																			
32	34	36	38	41	43	45	47	48	50	52	54	57	59	61	63																				
WRITE ADDRESS																																			
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																				
DATA																																			
33	35	37	39	40	42	44	46	49	51	53	55	56	58	60	62																				

FIG. 4

READ DATA		0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
MEMORY 1	READ ADDRESS	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	DATA	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	READ ADDRESS	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
	DATA	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
MEMORY 2	READ ADDRESS	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	DATA	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	READ ADDRESS	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
	DATA	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
MEMORY 1	READ ADDRESS	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	DATA	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	READ ADDRESS	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
	DATA	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
MEMORY 2	READ ADDRESS	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	DATA	0	8	16	24	32	40	48	56	1	9	17	25	33	41	49	57	2	10	18	26	34	42	50	58	3	11	19	27	35	43	51	59
	READ ADDRESS	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63
	DATA	4	12	20	28	36	44	52	60	5	13	21	29	37	45	53	61	6	14	22	30	38	46	54	62	7	15	23	31	39	47	55	63

FIG. 5

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

1ST, 3RD, 5TH, 7TH ROWS: UNCHANGED

2ND, 4TH, 6TH, 8TH ROWS: SHIFTED ONE PLACE

B0	B1	B0	B1	B0	B1	B0	B1
0	1	2	3	4	5	6	7
9	8	11	10	13	12	15	14
16	17	18	19	20	21	22	23
25	24	27	26	29	28	31	30
32	33	34	35	36	37	38	39
41	40	43	42	45	44	47	46
48	49	50	51	52	53	54	55
57	56	59	58	61	60	63	62



FIG. 6(a)

FIG. 6(b)

FIG. 6(c)

B0	B1	B0	B1	B0	B1	B0	B1
0	8	16	24	32	40	48	56
9	1	25	17	41	33	57	49
2	10	18	26	34	42	50	58
11	3	27	19	43	35	59	51
4	12	20	28	36	44	52	60
13	5	29	21	45	37	61	53
6	14	22	30	38	46	54	62
15	7	31	23	47	39	63	55

	B0	B1	B2	B3	B0	B1	B2	B3
0	8	16	24	32	40	48	56	
25	1	9	17	57	33	41	49	
18	26	2	10	50	58	34	42	
11	19	27	3	43	51	59	35	
4	12	20	28	36	44	52	60	
29	5	13	21	61	37	45	53	
22	30	6	14	54	62	38	46	
15	23	31	7	47	55	63	39	

	B0	B1	B2	B3	B0	B1	B2	B3
0	1	2	3	4	5	6	7	
11	8	9	10	15	12	13	14	
18	19	16	17	22	23	20	21	
25	26	27	24	29	30	31	28	
32	33	34	35	36	37	38	39	
43	40	41	42	47	44	45	46	
50	51	48	49	54	55	52	53	
57	58	59	56	61	62	63	60	

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

- 1ST, 5TH ROWS: UNCHANGED
- 2ND, 6TH ROWS: SHIFTED ONE PLACE
- 3RD, 7TH ROWS: SHIFTED TWO PLACES
- 4TH, 8TH ROWS: SHIFTED THREE PLACES

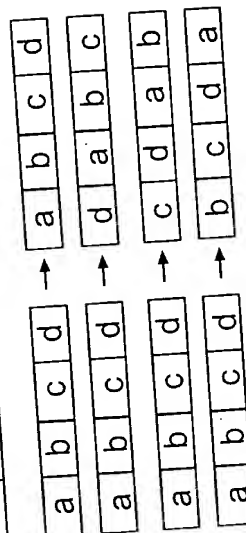


FIG. 7(c)

FIG. 7(b)

FIG. 7(a)

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

- 1ST ROW: UNCHANGED
- 2ND ROW: SHIFTED ONE PLACE
- 3RD ROW: SHIFTED TWO PLACES
- 4TH ROW: SHIFTED THREE PLACES
- 5TH ROW: SHIFTED FOUR PLACES
- 6TH ROW: SHIFTED FIVE PLACES
- 7TH ROW: SHIFTED SIX PLACES
- 8TH ROW: SHIFTED SEVEN PLACES

B0	B1	B2	B3	B4	B5	B6	B7
0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71
72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87
88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103
104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127
128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143
144	145	146	147	148	149	150	151
152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167
168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183
184	185	186	187	188	189	190	191
192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215
216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231
232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247
248	249	250	251	252	253	254	255
256	257	258	259	260	261	262	263
264	265	266	267	268	269	270	271
272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287
288	289	290	291	292	293	294	295
296	297	298	299	300	301	302	303
304	305	306	307	308	309	310	311
312	313	314	315	316	317	318	319
320	321	322	323	324	325	326	327
328	329	330	331	332	333	334	335
336	337	338	339	340	341	342	343
344	345	346	347	348	349	350	351
352	353	354	355	356	357	358	359
360	361	362	363	364	365	366	367
368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383
384	385	386	387	388	389	390	391
392	393	394	395	396	397	398	399
400	401	402	403	404	405	406	407
408	409	410	411	412	413	414	415
416	417	418	419	420	421	422	423
424	425	426	427	428	429	430	431
432	433	434	435	436	437	438	439
440	441	442	443	444	445	446	447
448	449	450	451	452	453	454	455
456	457	458	459	460	461	462	463
464	465	466	467	468	469	470	471
472	473	474	475	476	477	478	479
480	481	482	483	484	485	486	487
488	489	490	491	492	493	494	495
496	497	498	499	500	501	502	503
504	505	506	507	508	509	510	511
512	513	514	515	516	517	518	519
520	521	522	523	524	525	526	527
528	529	530	531	532	533	534	535
536	537	538	539	540	541	542	543
544	545	546	547	548	549	550	551
552	553	554	555	556	557	558	559
560	561	562	563	564	565	566	567
568	569	570	571	572	573	574	575
576	577	578	579	580	581	582	583
584	585	586	587	588	589	590	591
592	593	594	595	596	597	598	599
600	601	602	603	604	605	606	607
608	609	610	611	612	613	614	615
616	617	618	619	620	621	622	623
624	625	626	627	628	629	630	631
632	633	634	635	636	637	638	639
640	641	642	643	644	645	646	647
648	649	650	651	652	653	654	655
656	657	658	659	660	661	662	663
664	665	666	667	668	669	670	671
672	673	674	675	676	677	678	679
680	681	682	683	684	685	686	687
688	689	690	691	692	693	694	695
696	697	698	699	700	701	702	703
704	705	706	707	708	709	710	711
712	713	714	715	716	717	718	719
720	721	722	723	724	725	726	727
728	729	730	731	732	733	734	735
736	737	738	739	740	741	742	743
744	745	746	747	748	749	750	751
752	753	754	755	756	757	758	759
760	761	762	763	764	765	766	767
768	769	770	771	772	773	774	775
776	777	778	779	780	781	782	783
784	785	786	787	788	789	790	791
792	793	794	795	796	797	798	799
800	801	802	803	804	805	806	807
808	809	810	811	812	813	814	815
816	817	818	819	820	821	822	823
824	825	826	827	828	829	830	831
832	833	834	835	836	837	838	839
840	841	842	843	844	845	846	847
848	849	850	851	852	853	854	855
856	857	858	859	860	861	862	863
864	865	866	867	868	869	870	871
872	873	874	875	876	877	878	879
880	881	882	883	884	885	886	887
888	889	890	891	892	893	894	895
896	897	898	899	900	901	902	903
904	905	906	907	908	909	910	911
912	913	914	915	916	917	918	919
920	921	922	923	924	925	926	927
928	929	930	931	932	933	934	935
936	937	938	939	940	941	942	943
944	945	946	947	948	949	950	951
952	953	954	955	956	957	958	959
960	961	962	963	964	965	966	967
968	969	970	971	972	973	974	975
976	977	978	979	980	981	982	983
984	985	986	987	988	989	990	991
992	993	994	995	996	997	998	999

FIG. 8(a)

FIG. 8(b)

FIG. 8(c)

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0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

FIG. 9(a)

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

FIG. 9(b)

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0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

FIG. 9(c)

0	0	9	10	11	12	5	6	7
8	16	17	26	27	28	29	30	23
16	32	41	42	43	44	45	38	39
24	48	49	50	59	60	61	62	55

0	8	1	2	3	4	13	14	15
8	24	25	18	19	20	21	22	31
16	40	33	34	35	36	37	46	47
24	56	57	58	51	52	53	54	63

FIG. 9(d)

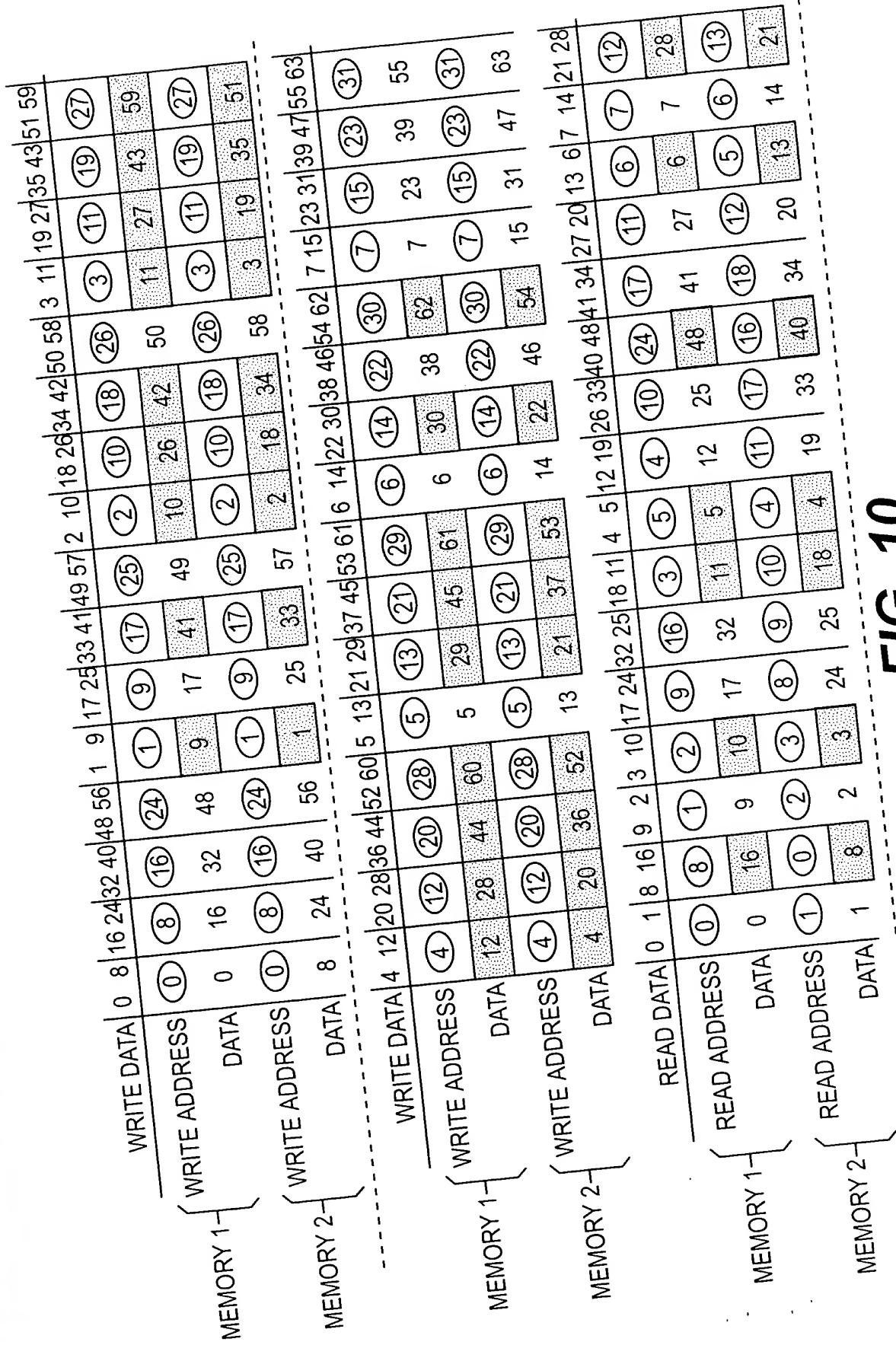


FIG. 10

FIG. 11

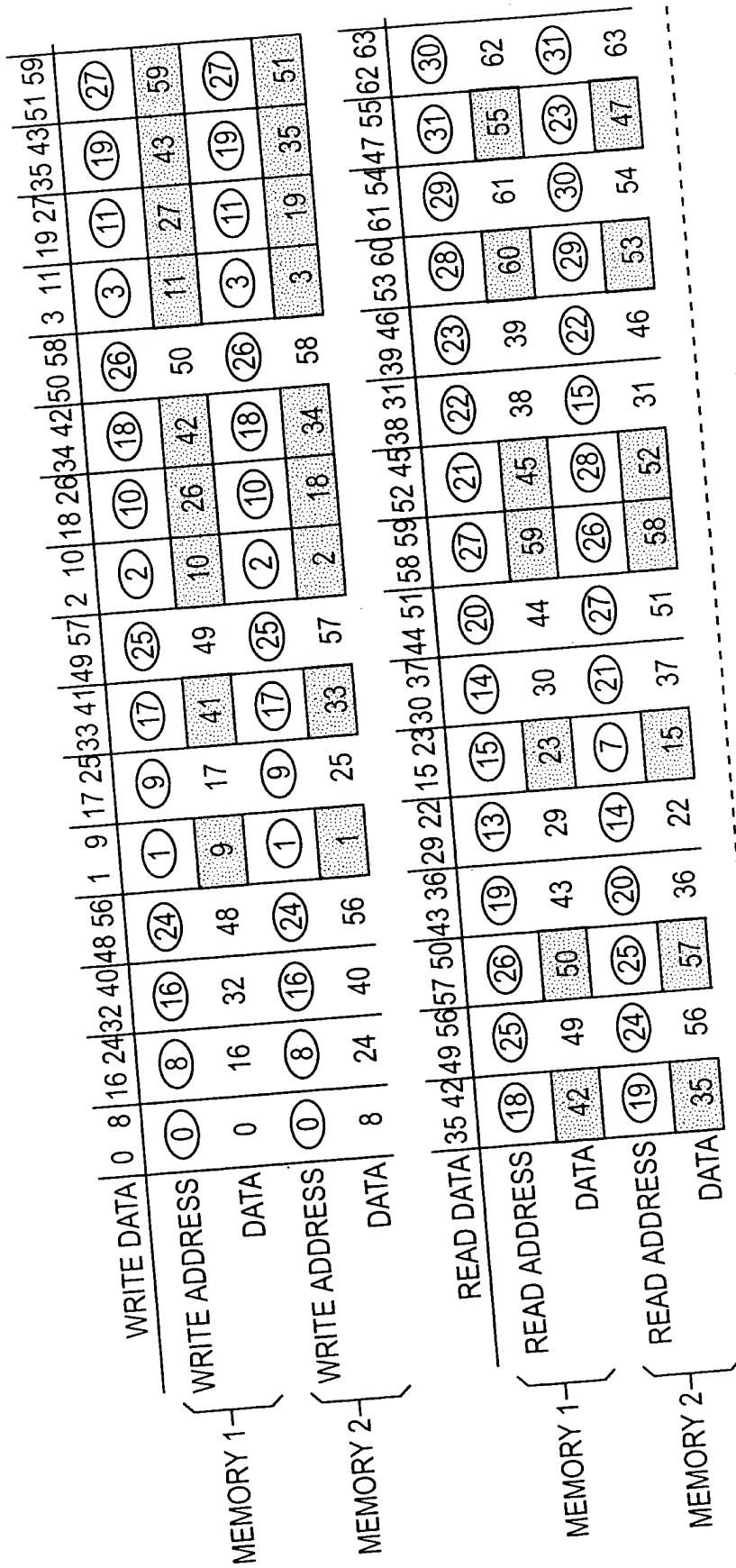


FIG. 11

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	17	18	19	20	21	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

FIG. 12(a)

B0	0	25	2	19	4	13	14	15
B1	8	9	50	59	12	5	6	7
B2	16	17	10	11	20	21	30	23
B3	24	1	18	3	28	37	22	47
B0	40	57	58	35	44	53	38	55
B1	32	41	42	51	60	29	46	63
B2	48	49	26	43	52	61	62	31
B3	56	33	34	27	36	45	54	39

FIG. 12(b)

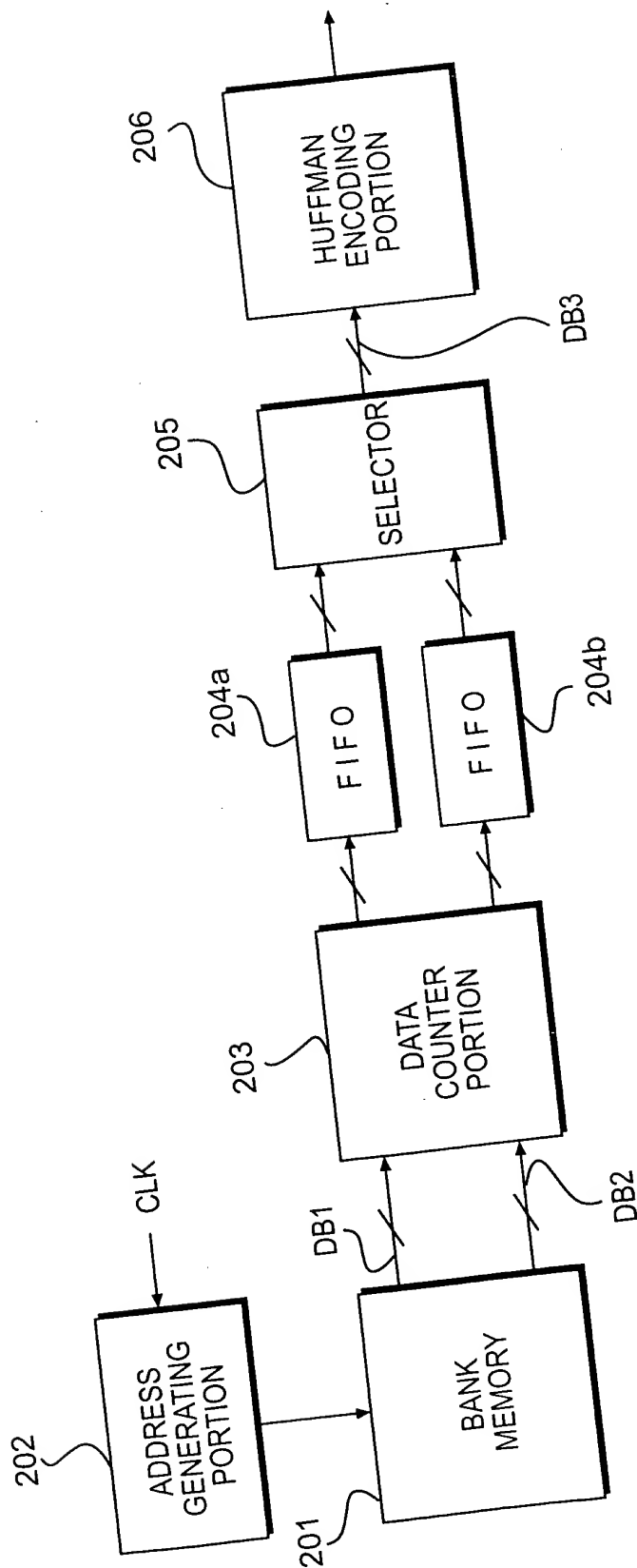


FIG. 13

FO/290" 42422424

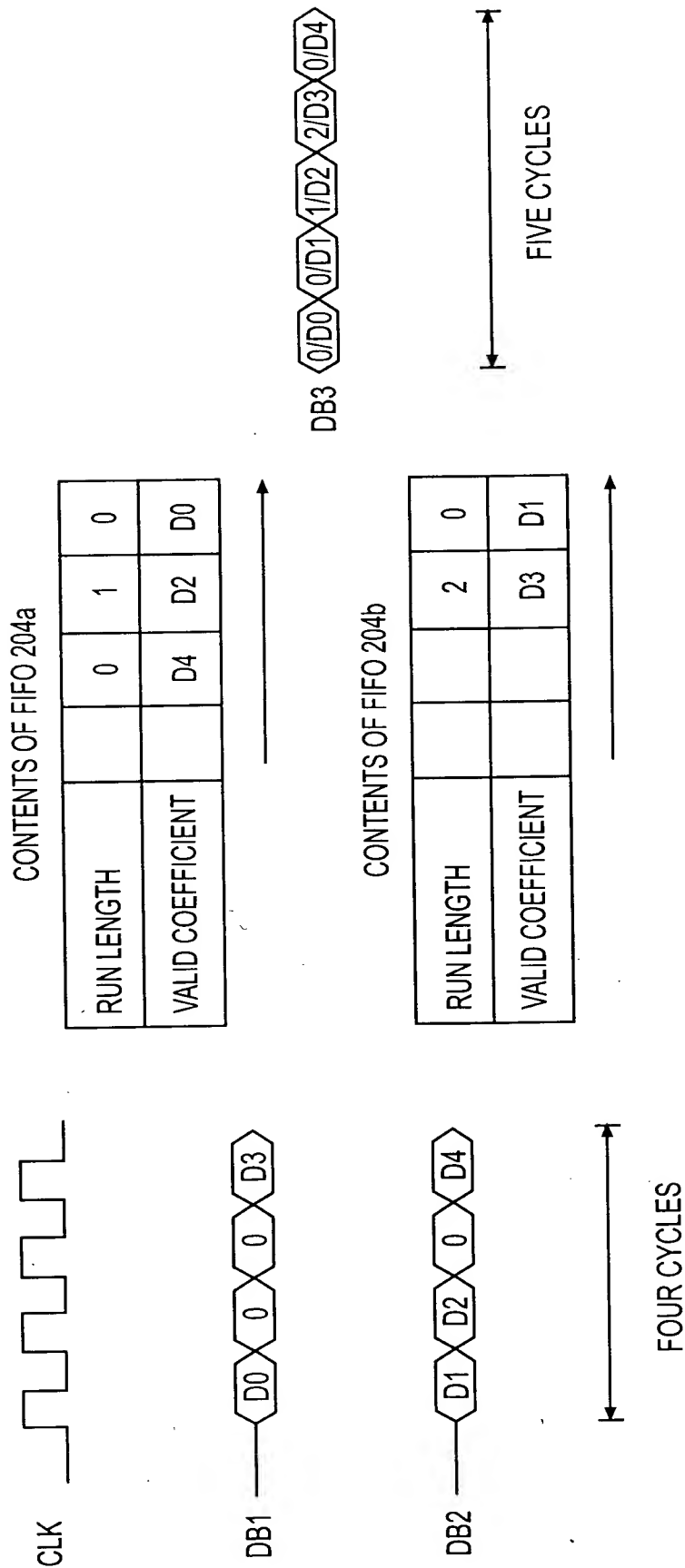


FIG. 14 (a)

FIG. 14 (b)

FIG. 14 (c)

FIG. 15

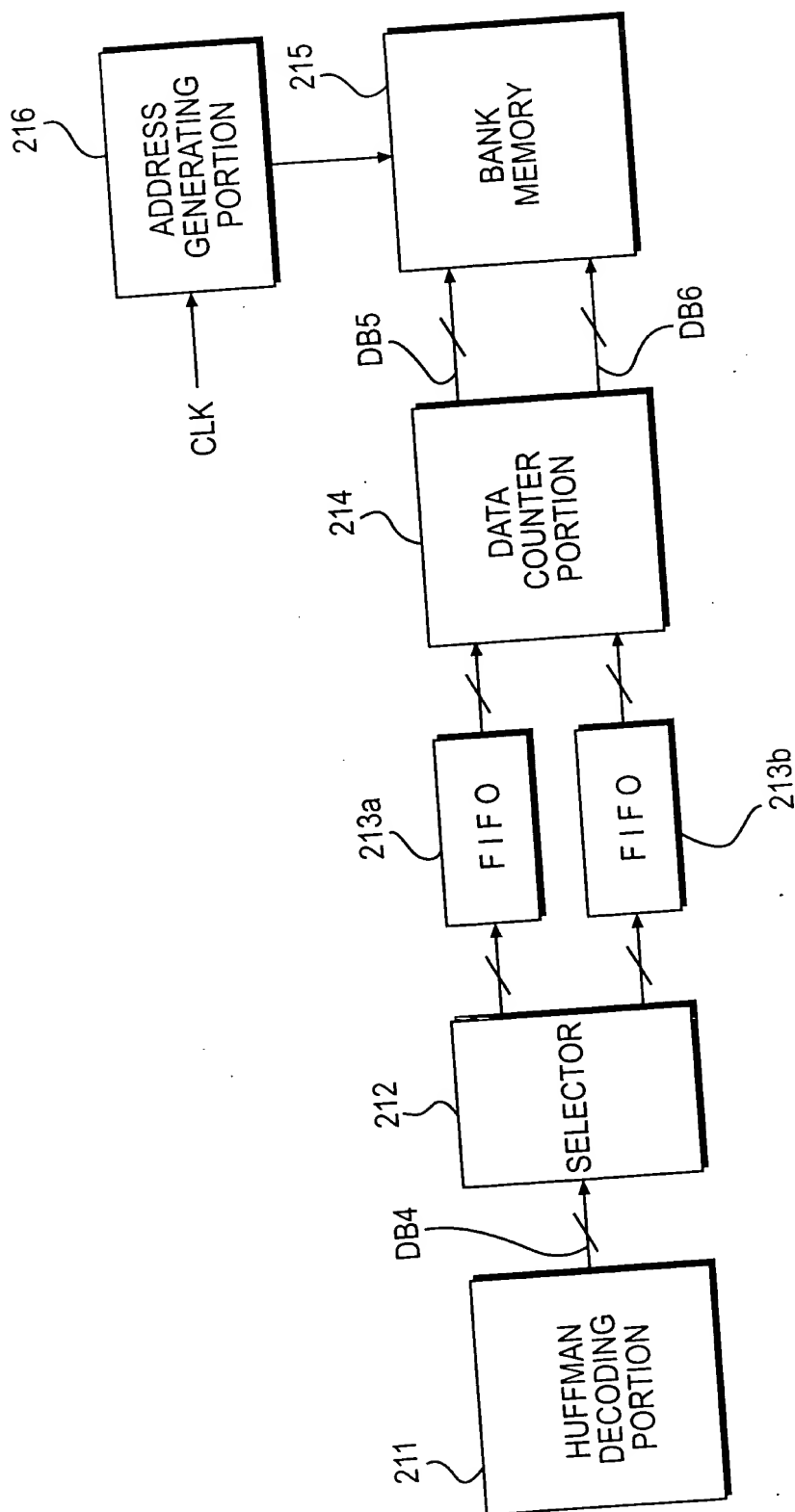


FIG. 15

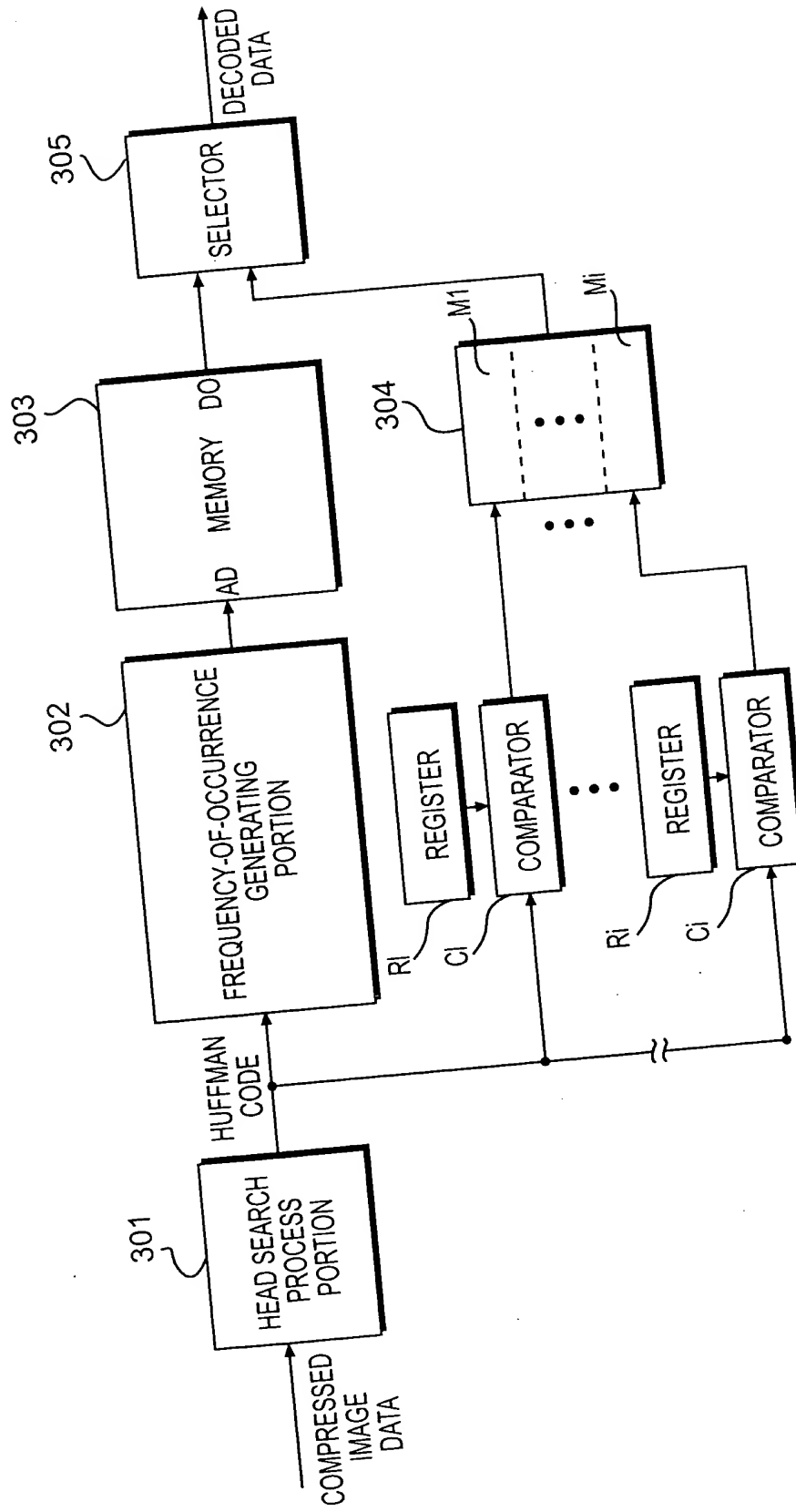
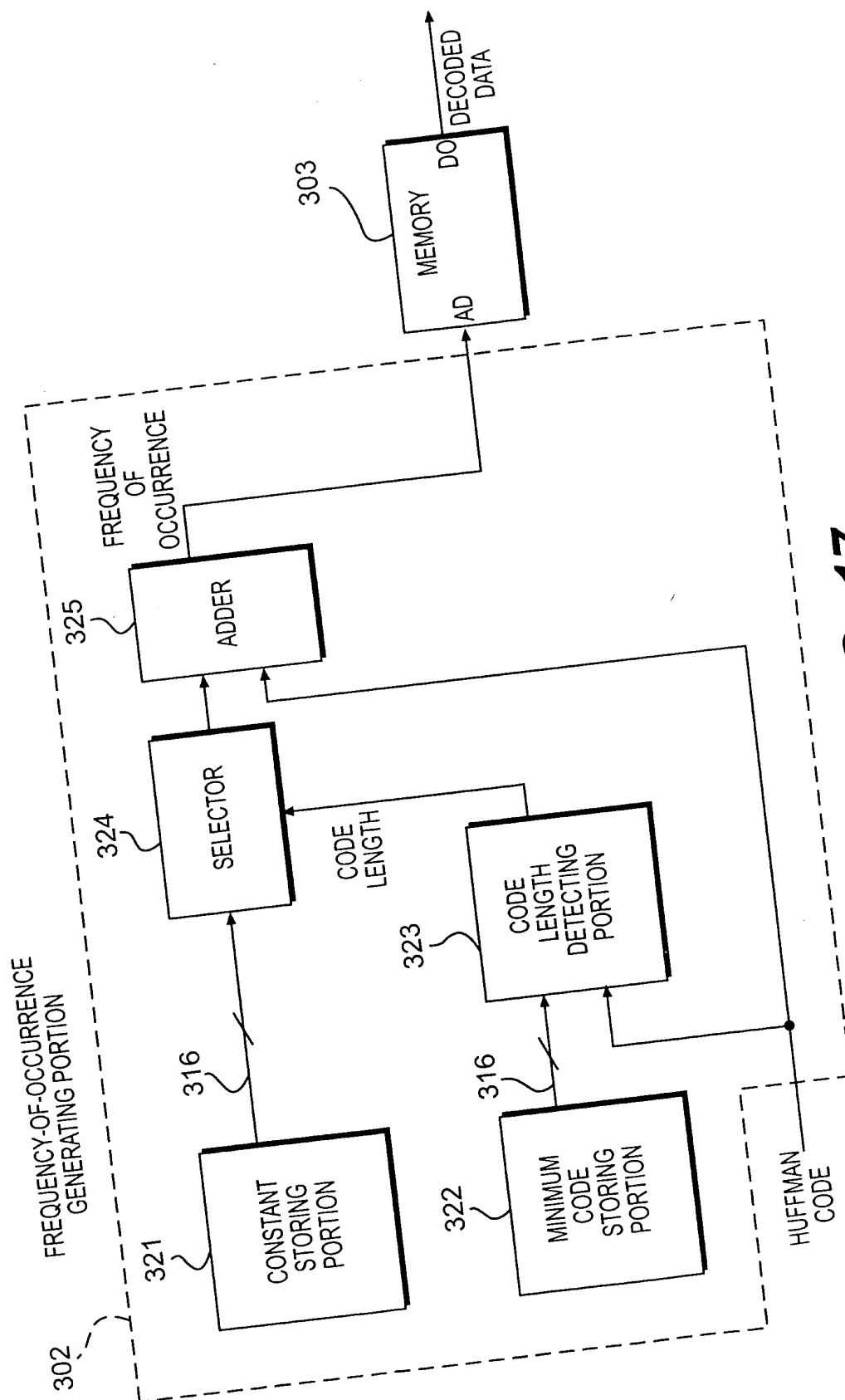


FIG. 16

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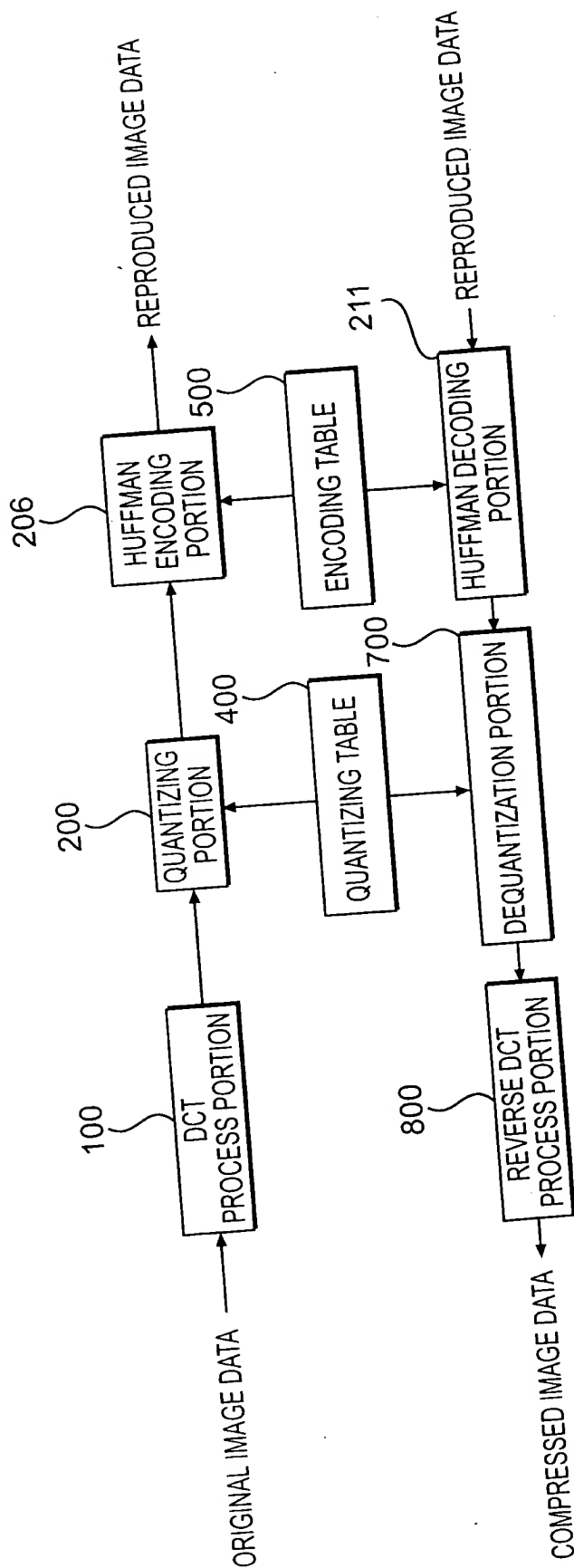
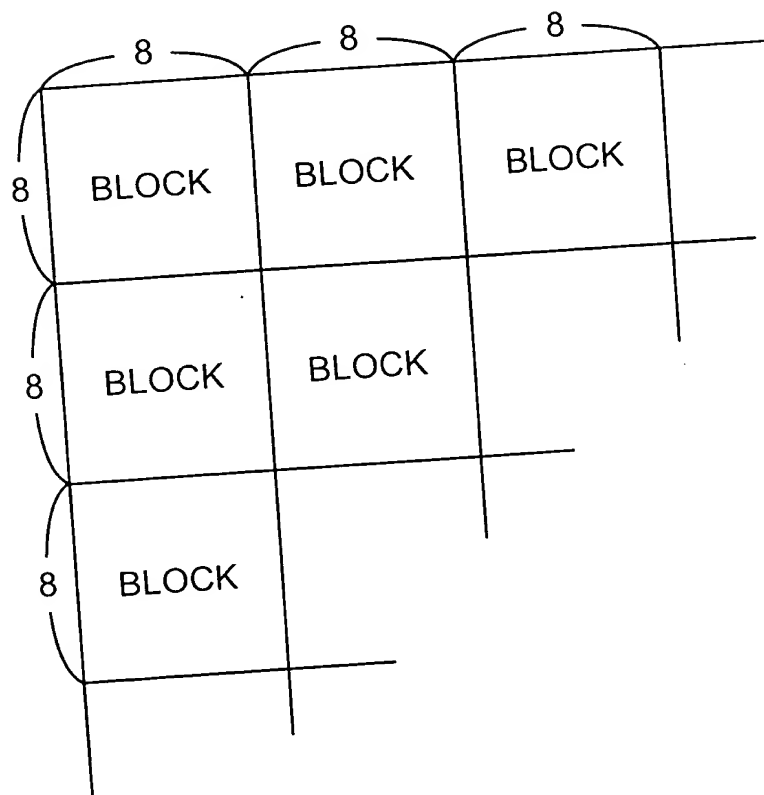
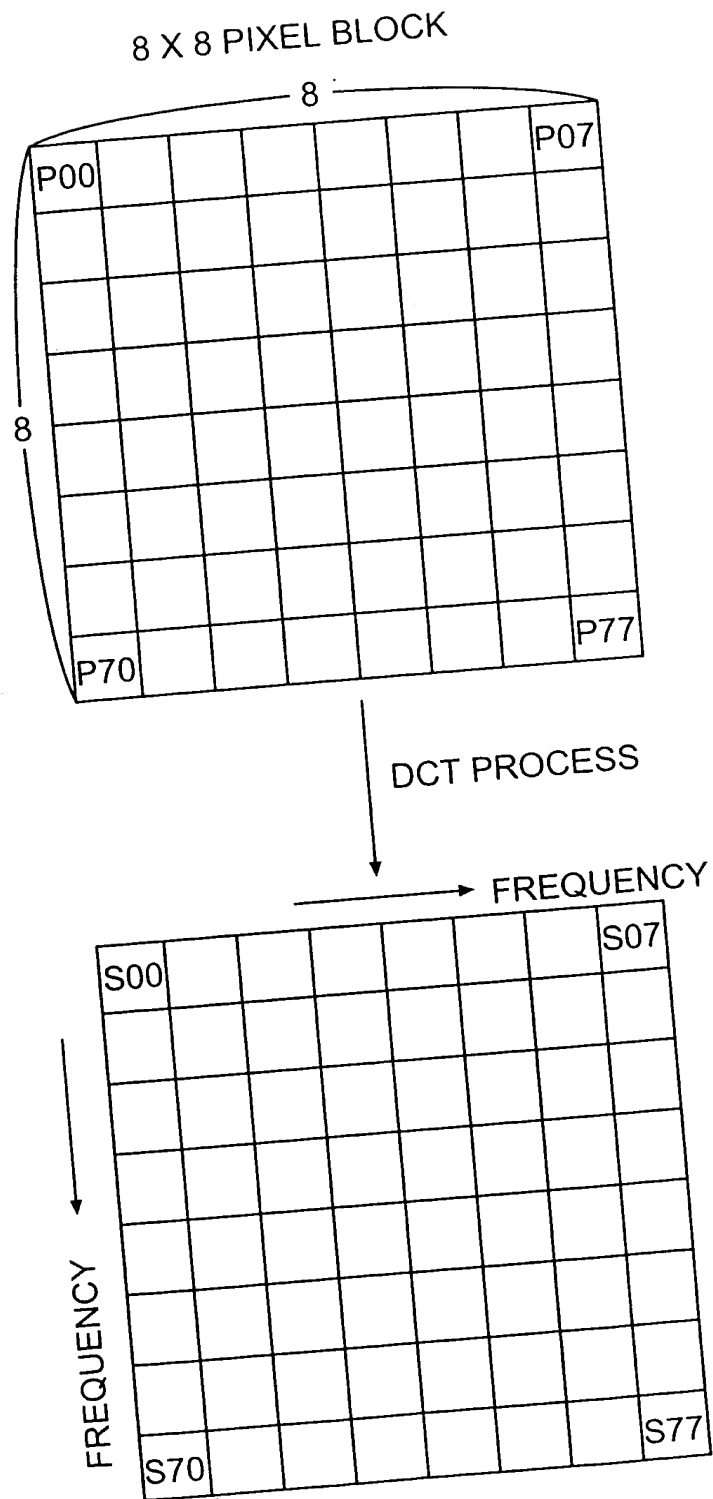


FIG. 18

FORMATION OF BLOCKS OF IMAGE DATA

**FIG. 19**

**FIG. 20**

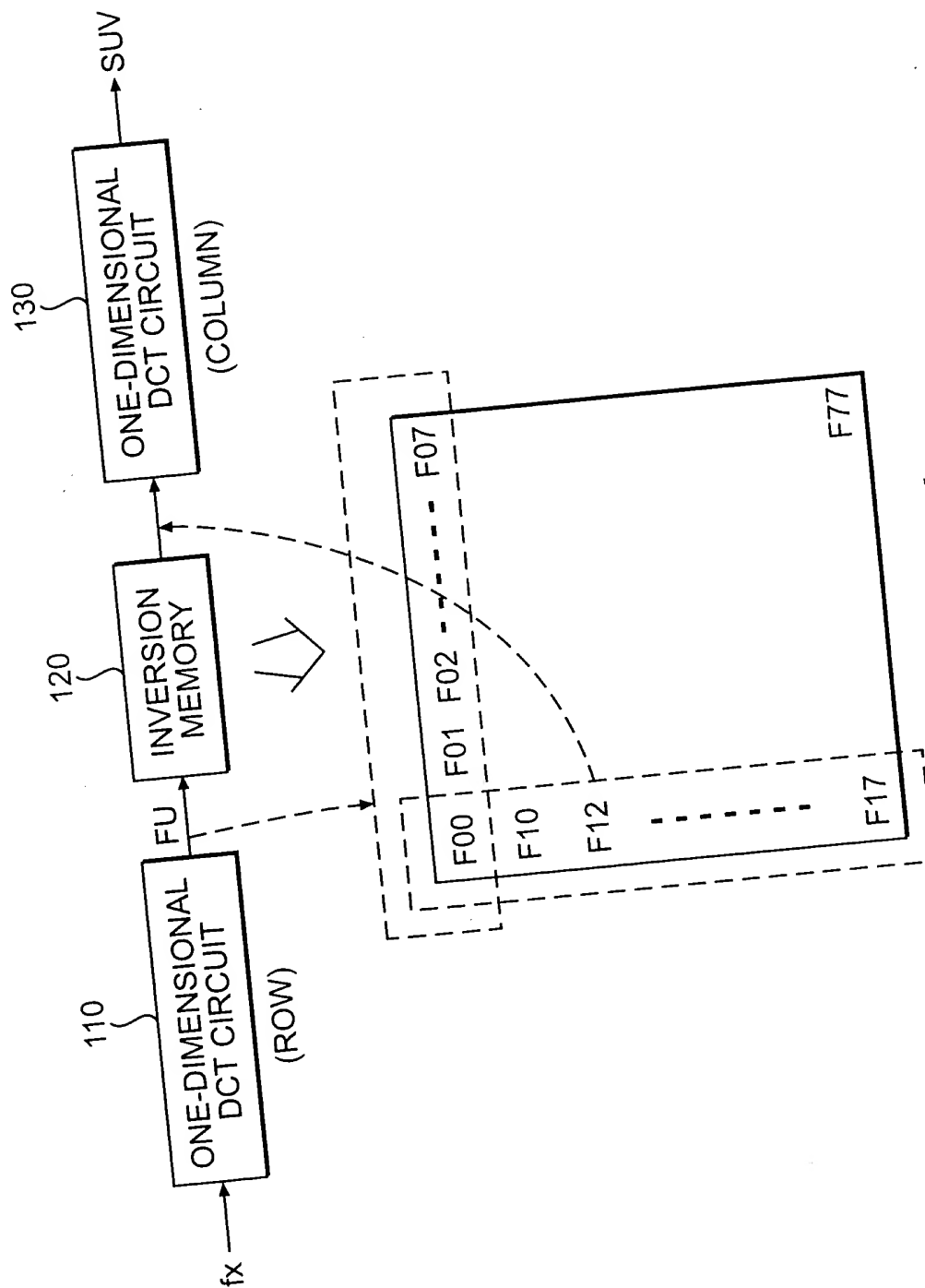
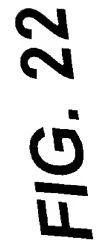


FIG. 21

[illegible]

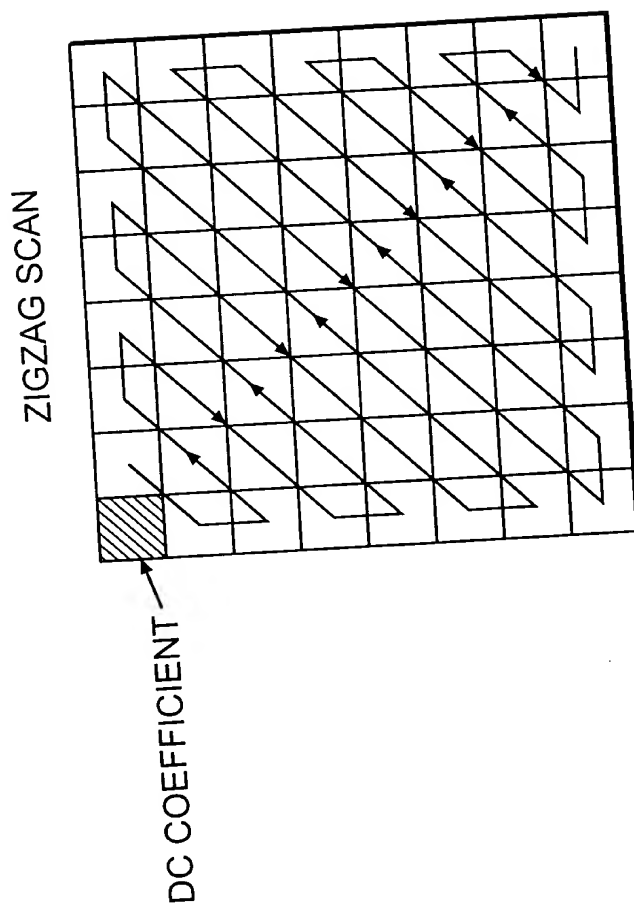


FIG. 23

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TM

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

RASTER SCAN (DIRECTION OF ROWS)

FIG. 24(a)

TM

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

RASTER SCAN (DIRECTION OF COLUMNS)

FIG. 24(b)

09/627424

BM

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

RASTER SCAN (DIRECTION OF ROWS)

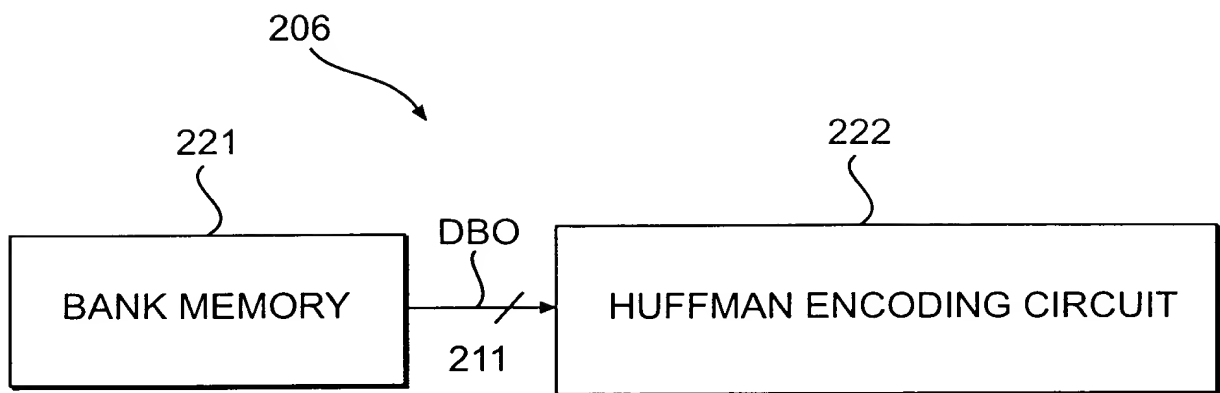
FIG. 25(a)

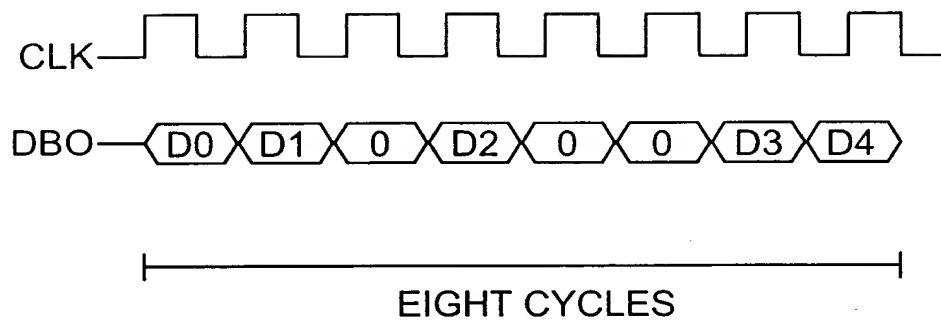
BM

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

ZIGZAG SCAN (DIRECTION OF COLUMNS)

FIG. 25(b)

**FIG. 26**

**FIG. 27**

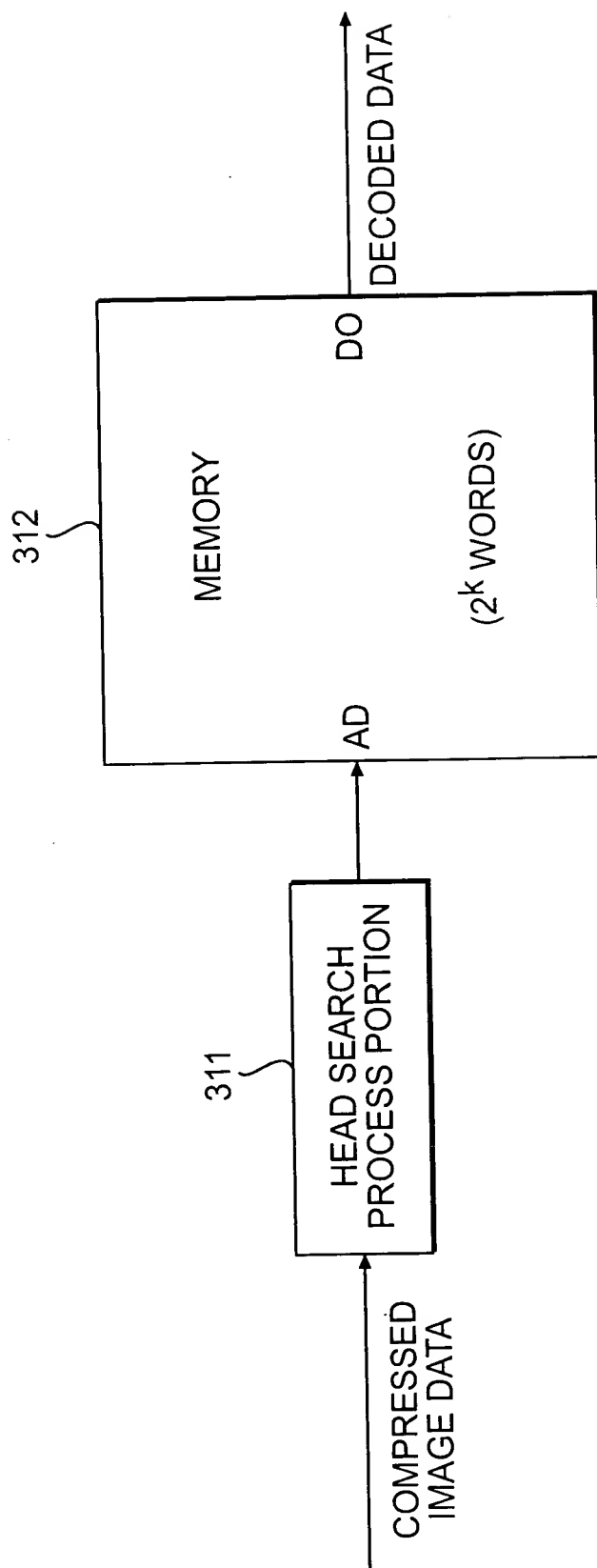


FIG. 28